

• **WHAT IS CLAIMED IS:**

1. A method for removing suspended particles from a soluble protein solution comprising the step of filtering the soluble protein solution through highly purified diatomaceous earth, thereby providing a clarified soluble protein solution.
2. The method of Claim 1, wherein the soluble protein solution is a secreted protein solution.
- 10 3. The method of Claim 1, wherein the soluble protein solution is a lysate.
4. The method of Claim 3, wherein the lysate is a bacterial lysate.
- 15 5. The method of Claim 3, where the lysate is a bacterial lysate containing a heterologous protein that was obtained by expression in bacteria.
6. The method of either Claim 4 or Claim 5 further comprising reducing the amount of DNA and endotoxins in the lysate.
- 20 7. The method of Claim 6 in which flocculation with polyethyleneimine at between about pH 7.3 and about pH 7.7 is used to reduce the amount of DNA and endotoxins in the lysate.
8. The method of Claim 6 in which the amount of DNA in the lysate is reduced by between about 100-fold and about 150-fold.
- 25 9. The method of Claim 6 in which the amount of endotoxins in the lysate is reduced by between about 1000-fold and about 10,000-fold.
- 30 10. The method of Claim 6 in which the turbidity of the soluble protein solution is reduced by between about 200-fold and about 300-fold.
11. The method of Claim 1 in which the soluble protein solution is stirred with highly purified diatomaceous earth before filtering through the filter press.

12. The method of Claim 1 in which the yield of the soluble protein solution is  
between about 95% and about 100%.

13. The method of Claim 1, wherein the highly purified diatomaceous earth is  
5 Celpure™.

14. The method of either Claim 4 or Claim 5 in which the bacteria is *E. coli*.

15. The method of Claim 5 further comprising blocking cysteine residues of the  
10 heterologous protein.

16. The method of Claim 15 in which the cysteine residues of the heterologous  
protein are blocked with an oxidizing agent.

15 17. The method of Claim 16 in which the oxidizing agent is a mixture of sodium  
sulfite and sodium tetrathionate.

18. The method of Claim 17 in which about a 2:1 ratio of sodium sulfite and  
sodium tetrathionate are added to the heterologous protein at a pH of between about 7.8 and  
20 about 8.2.

19. The method of Claim 16 further comprising deblocking the blocked cysteine  
residues of the heterologous protein.

25 20. The method of Claim 19 in which blocked cysteine residues of the  
heterologous protein are deblocked with a reducing agent.

21. The method of Claim 20 in which the reducing agent is dithiothreitol.

30 22. The method of Claim 5 further comprising resolubilizing refractile bodies in  
the lysate.

23. The method of Claim 5 in which the heterologous protein is SY161, wherein  
SY161 has an amino acid sequence as shown in SEQ. ID. NO. 1.